

(19)

Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

EP 0 814 393 A1

(12)

## EUROPEAN PATENT APPLICATION

(43) Date of publication:  
29.12.1997 Bulletin 1997/52

(51) Int Cl. 6: G05B 19/042

(21) Application number: 97850083.3

(22) Date of filing: 27.05.1997

(84) Designated Contracting States:  
CH DE DK ES FI FR GB LI NL

• Parasnis, Amalendu  
972 53 Lulea (SE)

(30) Priority: 20.06.1996 SE 9602505

(74) Representative: Karlsson, Berne  
Telia Research AB,  
Rudsjöterrassen 2  
136 80 Haninge (SE)

(71) Applicant: TELIA AB  
123 86 Farsta (SE)

(72) Inventors:

- Eriksson, Anders  
972 33 Lulea (SE)

### (54) Control and supervision of electrical components

(57) The invention relates to a system and a method at an information network which offers the user possibility to control and supervise electrical components by means of utilization of a public information network and the existing electrical power network. The invention utilizes a number of system components which by being combined in a certain way makes possible for a user to control and supervise his/her electrical components. The components consist of i.a. a user terminal, an information network, such as for instance Internet, electrical power distribution network, and a number of information managing units which manage and packet existing signals in the system in a necessary way. A user of the system consequently utilizes one to the information network connected terminal to inform the network resource about his/her wishes. The network interpretes said wishes and translates these into IS-commands (Intelligent Socket) and transmits these via the information network to STB for distribution on the ELAN, after which the addressed IS interpretes and performs necessary commands.

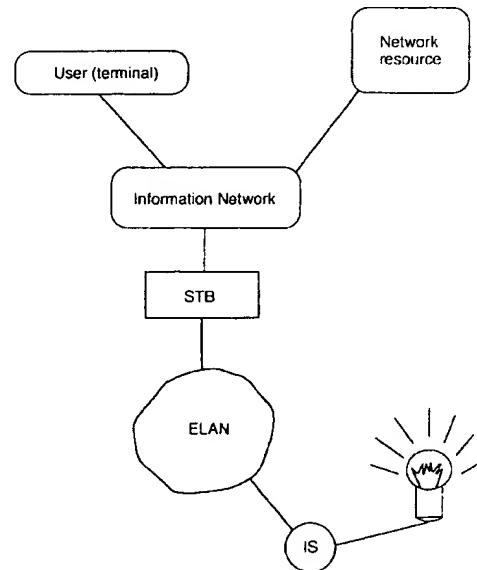


Figure 1

EP 0 814 393 A1

**Description****FIELD OF THE INVENTION**

The present invention relates to a system and a method for control and supervision of electrical components.

**PRIOR ART**

A usual way to control and supervise electrical components today is to utilize a computer which is programmed so that said components are activated or deactivated at a predetermined point of time, or the computer attends to a measurement of a specific component value at a given point of time. For control of electrical components also different kinds of timers are frequently utilized.

A problem with these control and supervision devices is that separate wiring must be made between the control/supervision devices and the component which shall be controlled respective supervised which of course will increase the costs.

Another problem is that the supervision or control devices are arranged comparatively close to the components which shall be controlled or supervised; the distance often varies between about 5 - 1000 m. This leads to that a supervisory operator must be within a very restricted area to be able to supervise said components.

The aim with the present invention consequently is to effect a system for global control and supervision of electrical components; the operator shall in principle be able to control or supervise just any electrical component irrespective of where the operator or component is.

One more aim with the present invention is to eliminate extra wiring between control/supervision devices and electrical components.

**SUMMARY OF THE INVENTION**

The above mentioned aims are achieved by a system and a method which is characterized in that a user of said system controls and supervises electrical components/devices connected to an electrical power distribution network by utilizing a public information network, preferably Internet, and said electrical power distribution network for transmission of instructions and data interchange.

An advantage with this is that the user can control/ supervise just any electrical component irrespective of where the user or the component is. The user utilizes for instance Internet for this purpose. By utilizing the existing electrical power distribution network connected to the electrical components/devices which shall be controlled/supervised, no extra wiring is required.

Further characteristics of the present invention are given in the subclaims.

**BRIEF DESCRIPTION OF THE DRAWING**

The present invention now will be described more in detail with reference to the only drawing.

5 Figure 1 shows the construction of the control or supervision system.

**DETAILED DESCRIPTION OF AN EMBODIMENT OF THE INVENTION**

10 The invention describes a global control and supervision of to an electrical network connected components via an information network, GSEK, and gives a description of what an implementation of the information network will look like.

15 By utilizing GSEK the user is offered possibility to control/supervise for instance his/her electrical components by a user-friendly interface. Below are indicated possible ways to utilize GSEK:

20 \* To the holiday-maker is offered for instance a customer adapted program which is executed in the network which during the absence controls lamps, radio, TV etc to simulate people at home and mislead thieves. The program of course can be reconfigured by the user during his/her absence by just any terminal.

25 \* The user can be offered information about the status of electrical components, Remote Status Checking (RSC), of the terminal the user is utilizing at the moment (for instance just anywhere by Internet). This will strikingly facilitate the operation and maintenance supervision of public buildings (hospitals, airports etc).

30 \* Managing of programable components (for instance video, start of sauna, heating of houses, heating of engines) from just any terminal (for instance Internet/WWW).

35 \* The GSEK-concept is cost-effective, because to offer GSEK there is no extra wiring needed at the user. Further, there is need for control logic at the user, since this is managed by the network resource. The only demand is that the electrical component which shall be controlled is equipped with an IS (Intelligent Socket).

40 By a measure with very limited influence on the electrical power distribution network the users which have access to a public information network can be offered possibility to control/supervise just any electrical components (for instance video, lamps, microwave ovens, advertising signs) connected to the electrical power distribution network. As example of possible information networks can be mentioned Internet/WWW.

45 To offer GSEK no extra wiring is needed because the existing electrical network is utilized as information carrier to the electrical components. The users equipment can be connected just anywhere within a defined area, which gives a certain mobility. Instruction signals

and data interchange over the electrical network (the ELAN) between the STB and the IS consequently are superimposed on the alternating voltage signals,  $U = 220\sin(\omega t)$  where  $f = 50$  Hz, which exist on the usual electrical network. Preferably these signals are transmitted on a frequency of about  $f = 50$  Hz, which signals are filtered out at the IS or the STB by means of a bandpass or highpass filter. In the STB and in the IS there of course also is a mixer which transforms said instruction signals and data interchange signals to the carrier frequency of about 50 kHz.

The in the GSEK-concept included units now will be described in detail with reference to Figure 1.

#### 1) IS

Intelligent Socket. An entity which communicates with STB over ELAN. By means of this communication IS can in its most simple embodiment control the supply of electrical power to the electrical component which is connected to the IS, and perform measurements on the connected electrical component and inform about the results to the STB/Network resource. Each IS can be uniquely identified by the network resource. This can be realized with today's technology.

#### 2) ELAN

The existing installation of electrical power network constitutes the local distribution network for instructions and data interchange between STB and ISes. This can be realized with today's technology, but standard equipment does not exist.

#### 3) STB

This entity receives information from the information network and packets it in suitable way for further transport to the IS over the ELAN. The STB also transmits information in reverse direction. The STB can be placed at an individual user or as a resource in common for a multiple of user higher up in the electrical power distribution network. This can be realized with today's technology.

#### 4) THE INFORMATION NETWORK

For further transmission of information between STB and the network resource just any information network can be used. For instance Internet/WWW. This can be realized with today's technology.

#### 5) NETWORK RESOURCE

An entity which has global control over and executes GSEK; can be realized with today's technology.

#### 6) THE USER

The subscriber of GSEK.

A user of GSEK utilizes one to the information network connected terminal to inform the network resource about his/her wishes. The network resource interprets the wishes of the user and translates these into IS-commands and transmits these via the information network to STB for distribution on the ELAN, after which ad-

dressed ISes interpret and perform commands.

The above mentioned is only to be regarded as a preferred embodiment of the present invention and the scope of protection of the invention is only defined by 5 what is indicated in the enclosed patent claims.

#### Claims

10. 1. System for control and supervision of just any electrical components/devices, **characterized** in that a user of said system controls and/or supervises said electrical components/devices by utilizing a public information network and existing electrical power distribution networks connected to said electrical components/devices for transmission of instructions and data interchange between said user and said electrical components/devices.
15. 2. System according to patent claim 1, **characterized** in that said public information network is Internet.
20. 3. System according to any of the patent claims 1 or 2, **characterized** in that said system includes a user terminal connected to said public information network, preferably Internet/WWW, a network resource connected to said information network, an information managing unit STB connected to said information network, at which said STB is connected to an ELAN, which ELAN is connected to just any specific IS which controls and/or supervises a specific electrical component/device.
25. 4. System according to patent claim 3, **characterized** in that each IS can uniquely be identified and addressed by said network resource.
30. 5. System according to patent claim 4, **characterized** in that said IS is an entity which communicates with said STB over said ELAN, at which said IS attends to control and/or measurement on the connected component/device and informs about the control- and/or measurement result to said STB/network resource.
35. 6. System according to any of the patent claims 3-5, **characterized** in that said network resource includes all control logic which is required for said instructions and data interchange between said user and said electrical component/device.
40. 7. Method for control and supervision of just any electrical components/devices, **characterized** in that a user controls and/or supervises said electrical components/devices by utilizing a terminal connected to a public information network, preferably Internet, and existing electrical power distribution networks connected to said electrical components/devices
- 45.
- 50.
- 55.

for transmission of instructions and data interchange between said terminal and said electrical components/devices.

8. Method according to patent claim 7, **characterized** in that said user by means of said terminal informs a network resource about his/her control and/or supervision wishes, after which said network resource translates these wishes to IS-commands and transmits these over said public information network to an information managing unit, STB, which STB packets said IS-commands in suitable way for further transmission over an ELAN to an IS which performs measurements on, or controls, one to said IS connected electrical component/device according to said IS-commands, after which said IS transmits network and/or control information via said ELAN to said STB for further transport via said public information network to said user.

20

25

30

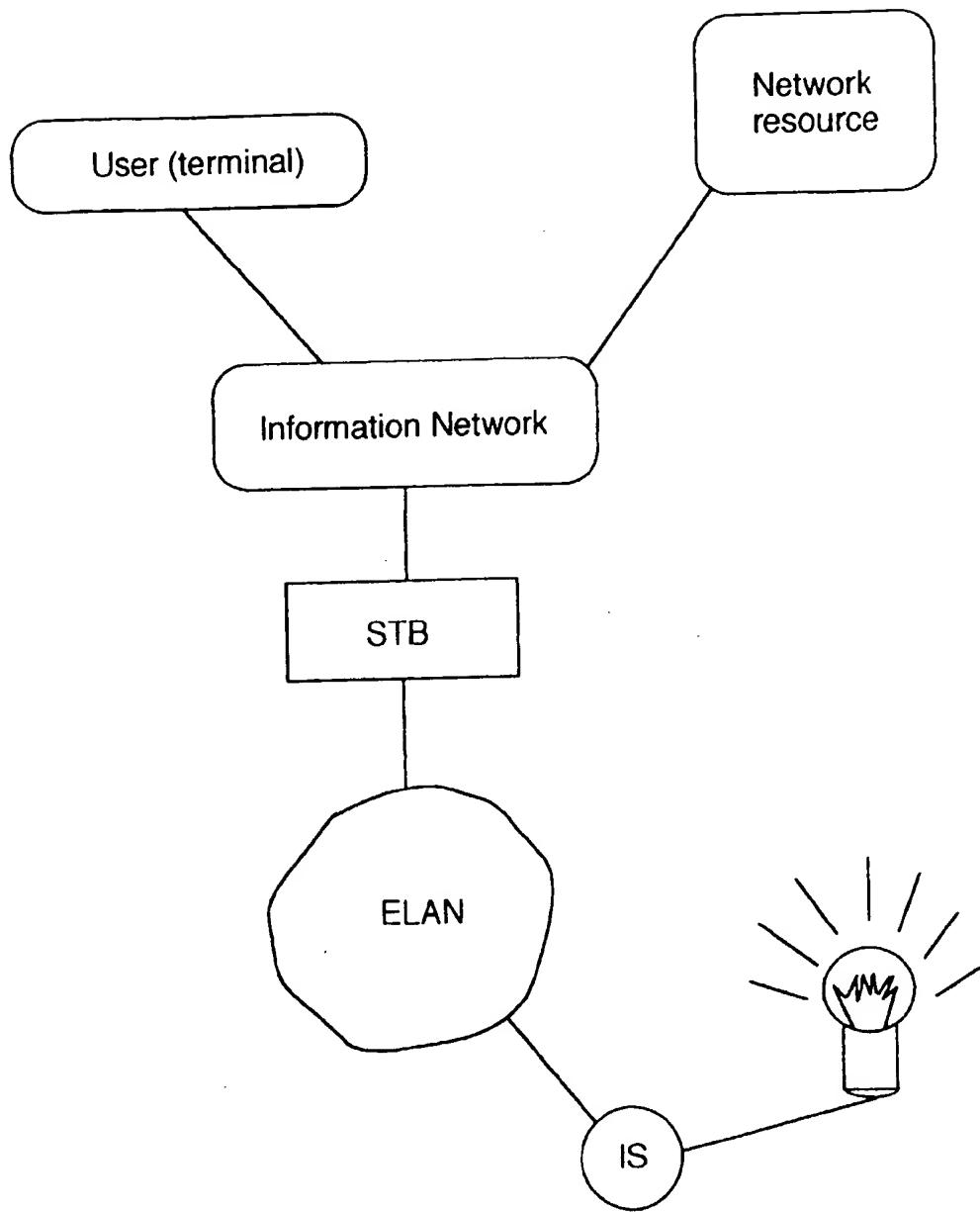
35

40

45

50

55



**Figure 1**



European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 97 85 0083

| DOCUMENTS CONSIDERED TO BE RELEVANT   |  |  | CLASSIFICATION OF THE APPLICATION (Int.Cl.) |                 |                                  |          |           |                   |           |
|---|--|--|---|-----------------|----------------------------------|----------|-----------|-------------------|-----------|
| Category  | Citation of document with indication, where appropriate, of relevant passages  | Relevant to claim  |   |                 |                                  |          |           |                   |           |
| X   | GB 2 286 903 A (SANYO ELECTRIC CO) 30 August 1995<br>* page 12, line 13 - page 17, line 2;<br>figures 1,2 *  | 1,3-8  | G05B19/042<br>H04L12/28                     |                 |                                  |          |           |                   |           |
| Y   | ---  | 2  |   |                 |                                  |          |           |                   |           |
| Y   | EP 0 602 787 A (CANON INFORMATION SYST INC) 22 June 1994<br>* the whole document *   | 2  |   |                 |                                  |          |           |                   |           |
| A   | ---  | 7,8  |   |                 |                                  |          |           |                   |           |
| X   | FR 2 660 781 A (ALCATEL BUSINESS SYSTEMS) 11 October 1991<br>* the whole document *  | 1,3-8  |   |                 |                                  |          |           |                   |           |
| X   | EP 0 429 056 A (SANYO ELECTRIC CO) 29 May 1991<br>* page 4, line 25 - page 5, line 42 *<br>* page 8, line 28 - page 9, line 53 *<br>* page 15, line 9 - line 30; figures 1-11<br>* | 1,7  |   |                 |                                  |          |           |                   |           |
| A   | PATENT ABSTRACTS OF JAPAN<br>vol. 018, no. 549 (E-1618), 19 October 1994<br>& JP 06 197132 A (KAWASAKI STEEL CORP),<br>15 July 1994,<br>* abstract *                               | 1,7,8  | G05B<br>H04L                                |                 |                                  |          |           |                   |           |
| A   | DE 38 42 467 A (MURATA MACHINERY LTD) 29 June 1989   | 1,4,7  |   |                 |                                  |          |           |                   |           |
| A   | WO 94 28635 A (KISS JOZSEF) 8 December 1994<br>---   | 1,4,7<br>-/-   |   |                 |                                  |          |           |                   |           |
| <p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 33%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>12 September 1997</td> <td>Hauser, L</td> </tr> </table> |  |  |   | Place of search | Date of completion of the search | Examiner | THE HAGUE | 12 September 1997 | Hauser, L |
| Place of search   | Date of completion of the search   | Examiner   |   |                 |                                  |          |           |                   |           |
| THE HAGUE   | 12 September 1997  | Hauser, L  |   |                 |                                  |          |           |                   |           |
| CATEGORY OF CITED DOCUMENTS   |  | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or<br>after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br><br>& : member of the same patent family, corresponding<br>document |   |                 |                                  |          |           |                   |           |
| EPO FORM 150 03.82 (P04/01)<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another<br>document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document   |  |  |   |                 |                                  |          |           |                   |           |



European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 97 85 0083

| DOCUMENTS CONSIDERED TO BE RELEVANT  |  |                   | CLASSIFICATION OF THE APPLICATION (Int.Cl.6) |                 |                                  |          |           |                   |           |
|--|--|-------------------|--|-----------------|----------------------------------|----------|-----------|-------------------|-----------|
| Category   | Citation of document with indication, where appropriate, of relevant passages  | Relevant to claim |  |                 |                                  |          |           |                   |           |
| A  | <p>CORCORAN P M ET AL: "A REMOTE ELECTRONIC OBJECT EMULATION SYSTEM FOR HOME BUS APPLICATIONS"<br/>IEEE TRANSACTIONS ON CONSUMER ELECTRONICS, vol. 40, no. 3, August 1994, NEW YORK, NY, US, pages 405-410, XP000471200<br/>* page 405 - page 410 *</p> <p>-----</p> | 1,7               |  |                 |                                  |          |           |                   |           |
|  |  |                   | TECHNICAL FIELDS SEARCHED (Int.Cl.6)         |                 |                                  |          |           |                   |           |
|  |  |                   |  |                 |                                  |          |           |                   |           |
|  |  |                   |  |                 |                                  |          |           |                   |           |
| <p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 34%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>12 September 1997</td> <td>Hauser, L</td> </tr> </table>  |  |                   |  | Place of search | Date of completion of the search | Examiner | THE HAGUE | 12 September 1997 | Hauser, L |
| Place of search  | Date of completion of the search   | Examiner          |  |                 |                                  |          |           |                   |           |
| THE HAGUE  | 12 September 1997  | Hauser, L         |  |                 |                                  |          |           |                   |           |
| <p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone<br/>     Y : particularly relevant if combined with another document of the same category<br/>     A : technological background<br/>     O : non-written disclosure<br/>     P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>     E : earlier patent document, but published on, or after the filing date<br/>     D : document cited in the application<br/>     I : document cited for other reasons<br/>     &amp; : member of the same patent family, corresponding document</p> |  |                   |  |                 |                                  |          |           |                   |           |